

1        **Amendment to the Claims**

2        **In the Claims:**

3              Please cancel Claims 17, 19 and 20.

4              Please amend Claims 1, 3-16, and 21-28, and add new Claims 29-45, as follows:

5              1. (Currently Amended) A device configured to collect airborne particles, comprising:

6                  a regenerable collection surface for supporting a spot of immobilized airborne  
7                  particles, wherein the collection surface is a regenerative surface;

8                  a surface regenerator configured to remove particles from the regenerable collection  
9                  surface, such that once regenerated, the regenerable collection surface can collect additional particles  
10                 from the air, and such that particles collected before the regeneration are substantially no longer  
11                 present to contaminate particles collected after the regeneration; and

12                 at least one a detector capable of sensing a biological signature in the spot.

13              2. (Cancelled)

14              3. (Currently Amended) The device according to claim 1, wherein the detector generates  
15                 electrical signals, and further comprising a receiver coupled to the detector for receiving the electrical  
16                 signals Claim 1, further comprising a spotting nozzle configured to direct an air stream towards the  
17                 regenerable collection surface, such that a resulting impact of the air stream with the regenerable  
18                 collection surface produces a spot of particles on the regenerable collection surface.

19              4. (Currently Amended) The device according to claim 1, further comprising an inertial  
20                 impactor for immobilizing the spot of airborne particles on the regenerative collection surface  
21                 Claim 1, wherein the regenerable collection surface is part of an impaction plate.

22              5. (Currently Amended) The device according to claim 1 Claim 1, wherein the detector is selected from the group consisting of a fluorescence detector, a Raman spectrometer, a Fourier transform infrared spectrometer, and a MALDI mass spectrometer.

23              6. (Currently Amended) The device according to claim 5 Claim 1, wherein the detector is a fluorescence detector capable of emitting excitatory radiation of wavelengths operative to excite biomolecules, further comprising an excitation light source configured to emit excitatory radiation that is directed towards the particles collected upon the regenerable collection surface, the excitatory radiation having a wavelength that excites any biomolecules comprising the particles to produce a fluorescence radiation to which the fluorescence detector responds.

1           7. (Currently Amended) The device according to ~~claim 1~~ Claim 1, wherein the biological  
2 signature is selected from the group consisting of an autofluorescence, a Raman spectrum, an infrared  
3 absorption spectrum, and a mass spectrum.

4           8. (Currently Amended) A device comprising:

5                 a regenerative regenerable collection surface configured for supporting a spot of  
6 immobilized airborne particles;

7                 a surface regenerator configured to remove particles from the regenerable collection  
8 surface to regenerate the regenerable collection surface, such that once thus regenerated, the  
9 regenerable collection surface can collect additional particles from the air, and such that particles  
10 collected before the regenerable collection surface was regenerated are substantially no longer  
11 present to contaminate particles collected after the regenerable collection surface was regenerated;

12                 an excitation light source for emitting excitatory radiation towards the spot, the  
13 excitatory radiation having a wavelength operative to excite biomolecules to produce fluorescence;  
14 and

15                 a fluorescence photosensor for measuring fluorescence radiation emitted from the  
16 spot.

17           9. (Currently Amended) The device according to ~~claim 8~~ Claim 8, wherein the excitatory  
18 radiation is substantially ultraviolet, and the fluorescence radiation is substantially visible.

19           10. (Currently Amended) The device according to ~~claim 8~~ wherein the excitation light  
20 source is a LED Claim 8, wherein the surface regenerator comprises at least one element selected  
21 from the group consisting essentially of:

22                 (a) a brush that regenerates the regenerable collection surface by brushing away  
23 particles that were collected on the regenerable collection surface;

24                 (b) a pad that regenerates the regenerable collection surface by pressing against the  
25 regenerable collection surface while the pad and the regenerable collection surface move relative to  
26 each other, so as to remove particles that were collected on the regenerable collection surface; and

27                 (c) a wheel coupled to a motor that regenerates the regenerable collection surface  
28 by pressing against the regenerable collection surface while the motor rotates the wheel, so as to  
29 remove particles that were collected on the regenerable collection surface.

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1       11. (Currently Amended) The device according to ~~claim 10 wherein the wavelength~~  
2 ~~operative to excite biomolecules is within a 340-370 nm range~~ Claim 8, wherein the surface  
3 regenerator comprises at least one element selected from the group consisting essentially of:

- 4             (a) a nozzle configured to direct a stream of high velocity air towards the  
5 regenerable collection surface to dislodge particles deposited thereon;
- 6             (b) a blade configured to scrape the regenerable collection surface to dislodge  
7 particles deposited thereon;
- 8             (c) means for electrostatically charging the collection surface, so that a static  
9 charge disperses the particles that were deposited thereon;
- 10            (d) means for directing energy to the particles collected upon the regenerable  
11 collection surface to dislodge particles deposited thereon; and
- 12            (e) means for directing energy to the regenerable collection surface to dislodge  
13 particles deposited thereon.

14       12. (Currently Amended) The device according to ~~claim 8 wherein the wavelength operative~~  
15 ~~to excite biomolecules is of approximately 266 nm~~ Claim 8, further comprising a processor  
16 configured to implement at least one function selected from the group consisting essentially of:

- 17           (a) producing an alarm signal if a signal from the fluorescence photosensor  
18 indicates that the particles collected on the regenerable collection surface are potentially harmful to  
19 biological organisms; and
- 20           (b) activating at least one additional component if the signal from the fluorescence  
21 photosensor indicates that the particles collected on the regenerable collection surface are potentially  
22 harmful to biological organisms.

23       13. (Currently Amended) The device according to ~~claim 8 wherein the wavelength operative~~  
24 ~~to excite biomolecules is of approximately 400 nm~~ Claim 8, further comprising a liquid coating  
25 applicator configured to moisten the regenerable collection surface prior to collecting the particles,  
26 thereby enhancing a particle collection efficiency of the regenerable collection surface.

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1       14. (Currently Amended) The device according to ~~claim 8~~ wherein the fluorescence  
2 ~~photosensor is a photodiode~~ Claim 8, further comprising a processor coupled to the fluorescence  
3 photosensor, the processor being logically configured to determine a concentration of biological  
4 particles collected on the regenerable collection surface, and to activate an alarm signal if the  
5 processor determines that the concentration of biological particles on the regenerable collection  
6 surface exceeds a predetermined value.

7       15. (Currently Amended) The device according to ~~claim 8~~ Claim 8, further comprising a  
8 dichroic mirror that substantially reflects excitatory radiation and is substantially transparent to  
9 fluorescence radiation, the dichroic mirror being positioned to reflect the excitatory radiation towards  
10 the spot.

11       16. (Currently Amended) The device according to ~~claim 15~~ Claim 15, further comprising at  
12 least one element selected from the group consisting essentially of an excitation filter positioned  
13 between the excitation light source and the dichroic mirror, and an emission filter positioned between  
14 the dichroic mirror and the fluorescence photosensor.

15       17-20. (Cancelled)

16       21. (Currently Amended) A method of detecting airborne biological particles, the method  
17 comprising:

18           depositing airborne particles on a regenerable collection surface provided for  
19 supporting a spot of immobilized airborne particles, ~~wherein the collection surface is a regenerative~~  
20 ~~surface~~, such that the deposited particles deposited on the regenerable collection surface form a spot;

21           measuring a biological signature present in the particles comprising the spot, using a  
22 detector capable of configured for sensing the biological signature in the spot of the particles;

23           determining a concentration of the immobilized airborne biological particles from the  
24 measurement of the biological signature; and

25           regenerating the regenerable collection surface by removing particles from the  
26 regenerable collection surface, such that once thus regenerated, the regenerable collection surface can  
27 collect additional particles from the air, and such that particles collected before a regeneration of the  
28 regenerable surface are substantially no longer present to contaminate particles collected after the  
29 regeneration.

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1           22. (Currently Amended) The method according to ~~claim 21~~ Claim 21, wherein the step of  
2 depositing is by results from an inertial impaction of the particles on the regenerable collection  
3 surface.

4           23. (Currently Amended) The method according to ~~claim 21~~ Claim 21, wherein the  
5 biological signature is an autofluorescence.

6           24. (Currently Amended) The method according to ~~claim 21~~ Claim 21, wherein the  
7 biological signature is selected from the group consisting of an autofluorescence, a Raman spectrum,  
8 an infrared absorption spectrum, and a mass spectrum.

9           25. (Currently Amended) A method of continuous monitoring ~~of to detect~~ airborne  
10 biological particles, ~~the method comprising during~~ a plurality of cycles, each cycle comprising the  
11 steps of:

12           depositing airborne particles on a ~~regenerative-regenerable~~ collection surface  
13 configured for supporting a spot of immobilized airborne particles to form a spot;

14           exciting the biomolecules comprising the biological particles to produce fluorescence  
15 with an excitation light source ~~for emitting that emits an~~ excitatory radiation towards the spot, the  
16 excitatory radiation having a wavelength operative to excite the biomolecules to produce  
17 fluorescence;

18           measuring an autofluorescence of the biomolecules in the particles forming the spot  
19 with a fluorescence photosensor ~~for measuring fluorescence radiation emitted from the spot~~;

20           determining a present value of a concentration of airborne biological particles from the  
21 measurement of the autofluorescence; and

22           regenerating the regenerable collection surface by removing particles from the  
23 regenerable collection surface, such that once thus regenerated, the regenerable collection surface can  
24 collect additional particles from air, and such that particles collected before a regeneration of the  
25 regenerable collection surface are substantially no longer present to contaminate particles collected  
26 after the regeneration.

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1        26. (Currently Amended) The method according to ~~claim 25~~ Claim 25, further comprising  
2 the steps of:

3                calculating an average value and a standard deviation from a defined number of prior  
4 present values obtained in ~~the defined~~ a corresponding number of preceding cycles;

5                comparing the present value to the average value; and

6                ~~outputting producing~~ an alarm signal if the present value exceeds a total of the average  
7 value ~~plus and a product, wherein the product is equal to~~ a preset factor multiplied by the standard  
8 deviation.

9        27. (Currently Amended) The method according to ~~claim 26~~ Claim 26, wherein the defined  
10 number is eight.

11        28. (Currently Amended) The method according to ~~claim 26~~ Claim 26, wherein the preset  
12 factor is between about 3 and about 5.

13        29. (New) The device according to Claim 6, further comprising a dichroic mirror that  
14 substantially reflects the excitatory radiation and is substantially transparent to the fluorescence  
15 radiation emitted by the excited biomolecules, the dichroic mirror being positioned to reflect the  
16 excitatory radiation towards the particles deposited upon the regenerable collection surface.

17        30 (New) The device according to Claim 29, further comprising at least one element selected  
18 from the group consisting essentially of:

19                (a) an excitation filter disposed between the excitation light source and the  
20 dichroic mirror; and

21                (b) an emission filter disposed between the dichroic mirror and the fluorescence  
22 detector.

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1           31. (New) The device according to Claim 1, wherein the surface regenerator comprises at  
2 least one element selected from the group consisting essentially of:

3                 (a) a brush that regenerates the regenerable collection surface by brushing away  
4 particles that were collected on the regenerable collection surface;

5                 (b) a pad that regenerates the regenerable collection surface by pressing against the  
6 regenerable collection surface while the pad and the regenerable collection surface move relative to  
7 each other, so as to remove particles that were collected on the regenerable collection surface; and

8                 (c) a wheel coupled to a motor that regenerates the regenerable collection surface  
9 by pressing against the regenerable collection surface while the motor rotates the wheel, so as to  
10 remove particles that were collected on the regenerable collection surface.

11           32. (New) The device of Claim 1, wherein the surface regenerator comprises at least one  
12 element selected from the group consisting essentially of:

13                 (a) a nozzle configured to direct a stream of high velocity air towards the  
14 regenerable collection surface to dislodge particles deposited thereon;

15                 (b) a blade configured to scrape the regenerable collection surface to dislodge  
16 particles deposited thereon;

17                 (c) means for electrostatically charging the regenerable collection surface, so that  
18 a static charge disperses the particles that were deposited thereon;

19                 (d) means for directing energy to the particles collected upon the regenerable  
20 collection surface to dislodge particles deposited thereon; and

21                 (e) means for directing energy to the regenerable collection surface to dislodge  
22 particles deposited thereon.

23           33. (New) The device of Claim 1, further comprising a liquid coating applicator configured  
24 to moisten the regenerable collection surface prior to collecting the particles, thereby enhancing a  
25 collection efficiency of the regenerable collection surface.

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1           34. (New) The device of Claim 1, further comprising a mechanical homing sensor that  
2 positions the regenerable collection surface relative to at least one additional component selected  
3 from the group consisting essentially of:

- 4                 (a) a spotting nozzle configured to deposit a spot of particles on the regenerable  
5 collection surface;
- 6                 (b) the detector;
- 7                 (c) the surface regenerator; and
- 8                 (d) a liquid coating applicator used to apply a liquid to the regenerable collection  
9 surface.

10          35. (New) The device of Claim 1, further comprising a processor configured to implement at  
11 least one function selected from the group consisting essentially of:

- 12                 (a) producing an alarm signal if the detector indicates that the particles collected  
13 on the regenerable collection surface are potentially harmful to biological organisms;
- 14                 (b) activating at least one additional component if the detector indicates that the  
15 particles collected on the regenerable collection surface are potentially harmful to biological  
16 organisms; and
- 17                 (c) determine a concentration of biological particles collected on the regenerable  
18 collection surface, and to activate an alarm signal if the processor determines that the concentration  
19 of biological particles on the regenerable collection surface exceeds a predetermined value.

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1           36. (New) The apparatus of Claim 1, further comprising a processor coupled to the detector,  
2 the processor being logically configured to implement at least one function selected from the group  
3 consisting essentially of:

4                 (a) determine a concentration of particles collected on the regenerable collection  
5 surface, and to activate an air sampler to obtain a sample of particles from the same general volume  
6 of air that provided the particles originally deposited on the regenerable collection surface;

7                 (b) activating an air sampler to obtain a sample of particles from the same general  
8 volume of air that provided the particles originally deposited on the regenerable collection surface, if  
9 the detector indicates that the particles collected on the regenerable collection surface are potentially  
10 harmful to biological organisms;

11                 (c) determine a concentration of particles collected on the regenerable collection  
12 surface, and to activate an analysis device to collect and analyze a sample particles from the same  
13 general volume of air that provided the particles originally deposited on the regenerable collection  
14 surface; and

15                 (d) activating an air analysis device to obtain and analyze a sample of particles  
16 from the same general volume of air that provided the particles originally deposited on the  
17 regenerable collection surface, if the detector indicates that the particles collected on the regenerable  
18 collection surface are potentially harmful to biological organisms.

19           37. (New) The method of Claim 21, further comprising the steps of:

20                 (a) comparing the concentration of immobilized airborne biological particles  
21 against predetermined criteria indicative of a potential alarm condition; and

22                 (b) if the concentration of immobilized airborne biological particles equals or  
23 exceeds the predetermined criteria, responding by implementing at least one step selected from the  
24 group of steps consisting essentially of:

25                         (i) activating an alarm signal directed to alert a designated party;

26                         (ii) manipulating an air management component;

27                         (iii) producing a warning signal;

28                         (iv) activating an air sampler to collect a sample of particles from the same  
29 general area that provided the airborne particles deposited on the regenerable collection surface; and

30                         (v) moving a damper in an air duct.

1           38. (New) The method of Claim 21, wherein the step of regenerating the collection surface  
2 comprises at least one step selected from the group of steps consisting essentially of:

3                 (a)     brushing the regenerable collection surface, to dislodge the particles deposited  
4 on the regenerable collection surface;

5                 (b)     pressing a pad against the regenerable collection surface while there is relative  
6 motion between the pad and the regenerable collection surface, to remove the particles deposited on  
7 the regenerable collection surface;

8                 (c)     pressing a wheel against the regenerable collection surface while there is  
9 relative motion between the wheel and the regenerable collection surface, to remove the particles  
10 deposited on the regenerable collection surface;

11                 (d)     directing a stream of high velocity air towards the regenerable collection  
12 surface to dislodge the particles deposited on the regenerable collection surface;

13                 (e)     electrostatically charging the regenerable collection surface to electrostatically  
14 disperse the particles deposited on the regenerable collection surface; and

15                 (f)     directing energy to the particles collected upon the regenerable collection  
16 surface to dislodge the particles deposited on the regenerable collection surface.

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1           39. (New) The method of Claim 25, wherein the step of regenerating the regenerable  
2 collection surface comprises at least one step selected from the group of steps consisting essentially  
3 of:

4                 (a) brushing the regenerable collection surface, to dislodge the particles deposited  
5 on the regenerable collection surface;

6                 (b) pressing a pad against the regenerable collection surface while there is relative  
7 motion between the pad and the regenerable collection surface, to remove the particles deposited on  
8 the regenerable collection surface;

9                 (c) pressing a wheel against the regenerable collection surface while there is  
10 relative motion between the wheel and the regenerable collection surface, to remove the particles  
11 deposited on the regenerable collection surface;

12                 (d) directing a stream of high velocity air towards the regenerable collection  
13 surface to dislodge the particles deposited on the regenerable collection surface;

14                 (e) electrostatically charging the regenerable collection surface to electrostatically  
15 disperse the particles deposited on the regenerable collection surface; and

16                 (f) directing energy to the particles collected upon the regenerable collection  
17 surface to dislodge the particles deposited on the regenerable collection surface.

18           40. (New) The device according to Claim 8, further comprising a particle counter.

19           41. (New) The device according to Claim 40, where the particle counter is capable of  
20 reporting a present value of particle counts in at least one predetermined size range.

21           42. (New) The device according to Claim 12, wherein the additional component comprises at  
22 least one component selected from the group consisting essentially of an adjacently positioned  
23 aerosol sampler and an adjacently positioned aerosol analyzer.

24           43. (New) The device according to Claim 1, further comprising a particle counter.

25           44. (New) The device according to Claim 43, where the particle counter is capable of  
26 reporting a present value of particle counts in at least one predetermined size range.

27           45. (New) The device according to Claim 35, wherein the additional component comprises at  
28 least one component selected from the group consisting essentially of an adjacently positioned  
29 aerosol sampler and an adjacently positioned aerosol analyzer.